

THURSDAY, SEPTEMBER 17, 1903.

THE WORTH OF EXPERIMENTAL PSYCHOLOGY.

Experimental Psychology and its Bearing on Culture.

By George Malcolm Stratton, M.A., Ph.D. Pp. vi + 331. (New York: The Macmillan Company; London: Macmillan and Co., Ltd., 1903.) Price 8s. 6d. net.

THE aim of this well written and interesting book, we are informed, is "to present . . . the character and value of the laboratory psychology, especially as bearing on our moral and philosophical interests. . . . Considerable attention has thus been given to the interpretation of the experimental results—to their more immediate scientific meaning, as well as to what they suggest for life and for speculation." The work, however, contains little that is really relevant to "the bearing of psychology on culture." Such topics as the value and significance of memory, suggestion and illusions, and the relation of psychology to the body and to the soul, ably as they are treated, are hardly synonymous with culture; indeed, from start to finish the object of the book is by no means evident.

It is to be regretted that Prof. Stratton did not confine himself to "the immediate scientific meaning," the range and the worth of psychological laboratory work. Once or twice this task has been already attempted in our language, but it has not yet been satisfactorily performed. The need for such a work has never been greater than now, when the number of psychological laboratories and their workers is multiplying rapidly, while physicists and physiologists are for the most part ignorant of, and hence are prone to ignore and to condemn, the aims and methods of experimental psychology. To this class of readers the present work is not well suited, and will hardly carry conviction. It appeals more to an educated public, which prefers to nibble at the significance of experimental psychology, and to swallow certain inevitable crudities of statement, rather than to digest the subject with proper care. The ground covered by the book is too vast, and departures from purely experimental topics are too often and too far made to allow of a really accurate and critical exposition. For this reason, no doubt, the author has made little attempt to exhibit the various themes of experimental study in their proper perspective. He has been forced to neglect some of the most important advances in purely psychological method, *e.g.* the work of G. E. Müller and his Göttingen school, and the genetic and comparative sides of experimental psychology; while undue space is given to some trivial experiments in æsthetics that have scant meaning or interest, and a few others are made to bear interpretations which are far from being justified in fact.

"Some recent experiments by Dunlap," says the author (pp. 88, 89), "show that lines, so drawn as to produce an illusion of distance [*i.e.*, the angle-forming lines in the well-known illusion of Müller-Lyer], may influence our estimate of space even when these lines are quite imperceptible."

Reference, however, to the statistical results of the

original paper and to its writer's own convictions shows that this conclusion is by no means so certain. The author uses these and other considerations in his chapters on the evidence for unconscious ideas. He ends with the statement (p. 92) that

"the results are not in favour of unconscious ideas, but rather of certain unconscious materials out of which conscious ideas arise."

One is tempted to ask how he can be sure, if the "materials" are unconscious, that they *are* "materials" and not "ideas." His psychological treatment of poetical rhythm is not convincing, the subject being too complex to tolerate an acrobatic arithmetic which connects all measures with "the pulse-time of attention." Probably the latter bears about the same relation to our appreciation of rhythm as our range of hearing to the enjoyment of a Beethoven symphony. Nor is it the whole truth, albeit the fashion to say (p. 269) that "what goes on in our minds never is really there until it is expressed," and that "in all manner of mental action there is some physical expression."

The chapters on the general character of psychological experiments, on imitation and suggestion, on illusions, and on the spatial perceptions of the blind, are quite ably and entertainingly written. The author's classification of illusions leads to curious results. He groups the illusion, in which a large box is judged lighter than a smaller box of equal weight, in the same class with the two fundamentally different illusions, in which truly isochronous intervals are subjectively resolved into rhythmic series, and in which a space of time filled with sounds is adjudged of different length from an equal but "empty" space of time. This class of illusions is said to arise "from stress of attention"! We are told also (p. 106) that within this class "the symbols themselves do not seem to be misinterpreted, they have been distorted . . . by our mental states." Elsewhere the author admits that *all* illusions "involve a misinterpretation."

But sufficient has been said to give a general notion of the faults and virtues of this book. In broad principles there is little to which the psychologist can take exception. Its style and language appear to be excellently suited to its readers, and the author has an adequately wide grasp of his subject. If he has failed in his task, the reason is because he has attempted too much. For to treat of the problem, which he has set himself, in three hundred or more pages is as impossible as it is to do justice to his bold endeavour within the compass of this review. C. S. MYERS.

HYDRAULICS.

Treatise on Hydraulics. By Mansfield Merriman, Professor of Civil Engineering in Lehigh University. Eighth Edition, Rewritten and Enlarged. Pp. viii + 585. (New York: John Wiley and Sons; London: Chapman and Hall, Ltd., 1903.) Price 21s. net.

THIS book bears the same title, has practically the same number of pages, and is published by the same firms, as a book by Prof. Bcevy, of McGill University, Montreal, which appeared in 1901, and was reviewed in these columns in February last year.

Though, however, the present book, like its predecessor, is intended primarily for students in colleges and technical schools, and secondly for engineers, and one or more problems, intended to be solved by the reader, are appended at the end of each article, relating to the special subject treated of in the article, it deals with the various hydraulic principles and problems successively investigated in a more simple manner than the former book, which is calculated to commend it to the favourable notice of practical engineers, too engrossed in their work to be able to spare the time for fully grasping abstruse mathematical considerations.

The book is divided into sixteen chapters, and is further subdivided into one hundred and ninety-two articles, each numbered, and dealing with a subject under a special heading connected with the general purpose of the chapter which contains it; whilst an appendix at the end, occupying forty-three pages, after pointing out certain analogies between the flow of water in pipes and the passage of the electric current along wires, and adding some miscellaneous problems for solution, furnishes fifty-five useful hydraulic and mathematical tables, the former being given both in English and in metric measures.

The first four chapters treat successively of "Fundamental Data," "Hydrostatics," "Theoretical Hydraulics," and "Instruments and Observations"; whilst the following six chapters are devoted to the consideration of the various kinds of flow, namely, through orifices, over weirs, through tubes, through pipes, in conduits, and the flow of rivers. The remaining six chapters deal with the important practical subjects of "Water-Supply and Water-Power," "Dynamic Pressure of Water," "Water-Wheels," "Turbines," "Naval Hydromechanics," and "Pumps and Pumping." Nearly two hundred figures in the text, mostly in the form of small, simple diagrams, serve still further to elucidate the hydraulic principles so clearly and concisely enunciated; and these diagrams, instead of being numbered consecutively in the usual manner, are given the same number as the articles which they illustrate, adding *a*, *b*, *c*, &c., where more than one occur in a single article; whilst the same system of numbering is adopted for distinguishing the formulas given in the several articles, and the problems appended at the end of them. The advantage of this peculiar method of numbering is not very clear, though possibly it furnishes an excuse for omitting headings from the diagrams, and for dispensing with a list of them. By the above arrangement, however, each article, with its special number and descriptive heading, constitutes a distinct unit, in which the diagrams and formulas are merged; and whereas the chapters in the text are only headed by their special subject, the headings in the table of contents under the main headings consist merely of an enumeration of the headings of the articles in each chapter, preceded by their distinguishing numbers.

The way in which several independent articles are grouped together in the chapters to which their subjects appertain, is well illustrated by the list of articles contained in the chapter on naval hydromechanics,

comprising "General Principles," "Frictional Resistance," "Work for Propulsion," "The Jet Propeller," "Paddle-Wheels," "The Screw Propeller," "Stability of a Ship," "Action of the Rudder," and "Tides and Waves." The concise and somewhat cursory manner in which the practical subjects considered in the last six chapters are touched upon, is sufficiently indicated by their taking up less than one-third of the whole contents of the book, and by such important and complex questions as water-supply and water-power being together dealt with in a single chapter of twenty-eight pages. This circumstance, however, must not be regarded as at all detracting from the merits of the book; for evidently the author is mainly concerned in laying down the principles of hydraulics, indicating the means and methods of taking observations, and establishing the laws of the flow of water under various conditions, to which subjects considerably the larger portion of the book is devoted. Then, after the principles and laws of hydraulics have been thoroughly elucidated, the methods of their application to various practical purposes, such, for instance, as water-power, water motors, propulsion, and pumping, are successively indicated, without the slightest intention on the part of the author that the brief treatment of these subjects should furnish substitutes for the standard treatises on them.

In the latter part of the book, indeed, the general features of the subjects introduced, and the action of the hydraulic machines are concisely sketched in suggestive descriptions, leaving a full investigation of the various matters touched upon to be sought elsewhere, according to the special branch on which more detailed information is required. Nevertheless, in spite of the brevity of the treatment, interesting particulars are here and there referred to, as, for example, the present utilisation of the Falls of Niagara in the development of 105,000 electrical horse-power, by means of turbines which are described, and the prospect in the near future of a largely increased use of this natural source of power; whilst it is suggested that the tides and waves afford a source of power which at present is wasted, but which, on the exhaustion of the supplies of coal, wood, and oil, may be utilised for generating power, heat, and light in unlimited quantities.

OUR BOOK SHELF.

Synthesen in der Purin- und Zuckergruppe. By Emil Fischer. Pp. 29. (Braunschweig: Friedrich Vieweg und Sohn, 1903.)

THIS lecture, delivered before the Swedish Academy at Stockholm on December 12 of last year, contains an account of Prof. Emil Fischer's work in organic synthesis, and of the motives that have guided him in attacking successively the problems of the uric acid, sugar, and more recently the albuminoid, groups of organic compounds. The synthetical methods by which the constitution of so many naturally occurring substances have been determined are described in outline only, and in a way that will appeal especially to the non-chemical reader. To the chemist the chief charm of the lecture lies in the frankness with which the lecturer describes the purpose and the ultimate goal of the work to which he has devoted himself.